Abstract No. Fuhr0465

Infrared Spectroscopy of Transgenic and Wild Type *Arabidopsis* Grown in High Cadmium Medium

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Beamline(s): U10B

Infrared spectroscopy offers the possibility of assessing mechanisms that plants may use to process toxic metals so they do not interfere with metabolic functions. Using FTIR microspectroscopy at beamline U10B, the spectra of leaves and roots of a number of species of plants were measured to determine if there are differences in spectra that may be used to determine how toxic metals are complexed in the plant. Figure 1 shows two synchrotron FTIR micro-spectra of leaves from two varieties of plants grown on Cd medium. One is a transgenic *Arabidopsis* that contains genes inserted to reduce Hg (II) to Hg (0). This transgenic plant, for unknown reasons, also has the capacity to thrive in high Cd medium. The wild type plant is the same species, but without the added genes, so it grows poorly in the Cd medium. In this first exploratory experiment, there were consistent and different features in the FTIR micro-spectra of the two varieties of plants that were both grown on agar containing 50mM Cd. Protein amide bands were more intense for the transgenic plants while bands for polysaccharides (indicating lignin, cellulose, cell wall material) were much more intense for the wild type plants. Additional absorption bands were also observed in the spectra of wild type plants. This may be the result of poor health of the wild type plants, in contrast to the better growth of the transgenic plant, or it may indicate differences in their response to Cd. More detailed experiments are planned.

Acknowledgments: This work was funded by the DOE LTR program through a CRADA with Applied PhytoGenetics.

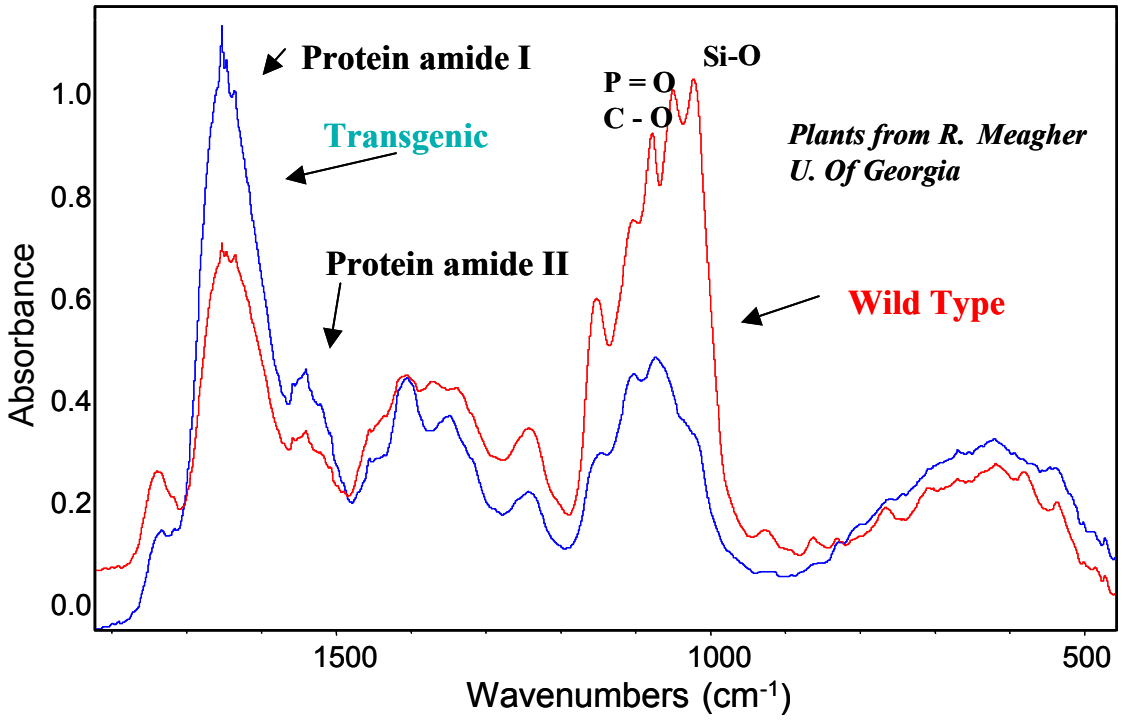

Figure 1. Synchrotron FTIR spectra of leaves from transgenic and wild type *Arabidopsis* grown on 50mM Cd medium.